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CORPORATE PROFITS AS SHOWN BY AUDIT REPORTS, by W. A. Paton (151 pp., 10 tables, 5 charts, $1.25)

Copies of this book, Volume 28 in the National Bureau publications series, have been distributed to subscribers and are now on sale. Although fewer corporations are covered than in Dr. Epstein's sample and the period studied is shorter, the individual statements give fuller details. For these financial statements the National Bureau is indebted to cooperating members of the American Institute of Accountants. The preface by Mr. George O. May points out that much might be learned about the workings of our economic system if a broadly representative sample of audited financial statements could be made available for analysis year after year.

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Aspects of Manufacturing Operations during Recovery

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I. THE PROBLEM, THE DATA, AND SOME LIMITING CONDITIONS

A SUBSTANTIAL economic recovery has occurred in the United States since the low point of the depression was reached early in 1933. By January-February, 1935, the level of wholesale prices had risen 33 per cent. In manufacturing industries the volume of production had increased 49 per cent, the total number of persons employed had increased 33 per cent, and total wage disbursements had advanced 72 per cent. The evidence of real improvement is unmistakeable, despite the recurrent checks that have been felt from time to time.

Particular interest attaches to the nature of this recovery, because of the novel elements that have played a part in it. The forces operating in the traditional revival have been compounded in complex ways with elements of a consciously formulated program of economic recovery. For this reason it is of particular interest to know whether there have been shifts in the internal processes of recovery, shifts that might be associated with special elements of the recovery program. Again, we may ask whether this recovery has conformed, in general, to the pattern of earlier business revivals. This question is pertinent today not only as a matter of historical interest but also because it bears upon the probable future course of recovery. We may not appraise current economic changes solely with reference to past standards, but reference to these standards may illuminate the present situation.

There are, of course, more specific questions centering about the recovery program, as it affected manufacturing industries. What has been the effect of the novel conditions of 1933-35 upon industrial productivity? How have labor costs in manufacturing plants been affected? How much has the aggregate purchasing power of manufacturing labor been increased? Has this increase differed in important ways from the customary expansion of labor's purchasing power during business revival? These, and the more general questions suggested above, deal with matters of major importance today, when recovery is being sought under an intermixture of old and new conditions. Not all these questions may be answered definitely, but their urgency justifies an attempt to cull from available data evidence relevant to these central issues.

This attempt has been made in preparing the measurements given in this paper. A considerable margin of error is present, for certain items, because of limitations upon the coverage of the original records utilized, or because of imperfect comparability of series drawn from different sources. Recognition of this margin of error, of the type that is present whenever representative data are employed, is necessary in using the detailed figures given below. But the general consistency of the results secured leaves no doubt as to the substantial truth of the evidence drawn from these records.

The records of recovery are to be interpreted, of course, with reference to the background of the preceding recession, as this affected manufacturing industries. Over a period of less than four years the physical volume of manufacturing production had been cut in half, the average selling price of manufactured products had fallen 31 per cent, and the aggregate gross income of manufacturing enterprises had been reduced almost two-thirds. The number of employed wage-earners had fallen approximately 43 per cent, the average hourly wage had declined some 23 per cent, and average earnings per wage-earner had dropped 39 per cent. The total wage disbursements of manufacturing industries had declined 65 per cent, a drop which, corrected for changes in living costs, meant a loss of ap-

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proximately 50 per cent in the actual aggregate purchasing power of manufacturing labor. In no recent business recession have equal losses been suffered by manufacturing industries. The price decline of 1920-21 exceeded the drop of 1929-33, it is true, and in other respects the first post-War recession was of a magnitude roughly comparable to the most recent decline. But in prolonged severity the recession and depression of 1929-33 have no counterpart in the economic records of recent years. Reflections of the drastic preceding recession will appear in the movements of recovery, which may be dated from the early months of 1933.[1]

This recovery was spotty and uneven, probably less homogeneous than any similar period of economic revival of which we have record. Relief from the immediate fears engendered by the banking crisis, a series of developments affecting the present and anticipated values of the dollar, the prospect, and then the reality, of extensive changes in operating and marketing conditions growing out of the adoption of industrial codes, fundamental changes in the conditions affecting the issuance of new securities and the allocation of investment funds, the initiation of Federal expenditures for relief on a hitherto unprecedented scale—these followed one another in rapid succession. Within 24 months the business 'climate' underwent a series of changes such as might normally have been spread over many years. These and other developments affected the shifting course of recovery between February, 1933, and the early months of 1935. The first sharp spurt, which carried to mid-summer, 1933, was followed by a recession, extending to the end of 1933, a spring revival in 1934, a set-back extending through the summer months, and a recovery that has continued through the end of 1934 and the early part of 1935.

Some new factors were present in each of these periods, but the most notable differences separate the first phase of sharp expansion from the alternations of contraction and expansion that follow. These differences lie, partly, in the extent of the movements. The first recovery far exceeded in magnitude the two short up-turns that occurred in the spring of 1934 and the winter of 1934. Again, the first rise and the later movements are marked off by important differences in operating conditions, in the field of manufacturing. The first of the codes introduced under the National Industrial Recovery Act was approved on July 9, 1933; the blanket code accepted by industry under the President's Re-employment Agreement went into effect on August 1, 1933. The operating conditions prevailing in manufacturing industries underwent a major change with the inauguration of the codes. In this fundamental respect, then, the circumstances attending the first phase of recovery, up to the summer of 1933, are clearly distinct from those prevailing thereafter. It is true that the prospect of operation under the codes helped to stimulate the early advance and affected the character of that advance. But the detailed regulations later prescribed under the industrial codes did not, of course, affect operating conditions during this first surge of recovery.

We must recognize that many factors, other than the codes, distinguish the first phase of recovery from the period that followed. The stimulus of monetary change was a potent force in the first surge of renewed activity. Hopes and fears centering around the prospects of inflation were stronger in the first few months than later. Production for stock was perhaps more important during the first phase than during the second, and such production would leave its impress upon the movements of the later period. The potentialities of rapid advance in productivity and sharp reduction of operating costs were greater at the very low level of activity prevailing in February, 1933, than they were after the bloom of the first revival had passed. The factors affecting operating conditions over a short period differ in various ways from those that affect operating conditions over a longer interval. It would be improper to attribute to the influence of the industrial codes all the differences we shall note between the operating conditions prevailing in manufacturing industries prior to and following the adoption of these codes. Yet these differences are part of the data required for an appraisal of the codes and of the shifting currents of economic change from 1933 to 1935.

For these reasons, then, we shall break the two years of recovery here reviewed into two phases—the sharp rise extending from February-March, 1933, to June-July, 1933, and the period from the summer of 1933 to January-February, 1935. Since the turning points that mark off these periods of recovery from one another are not in all cases clearly to be located in one particular month, and since they do not coincide, in time, for all the series to be followed, the limits of the several periods are set with reference to averages of measurements covering two months.

The basic series from which all other measurements are derived, in tracing the changes of recovery, are given in

[1] It is an open question whether this revival in the United States should be dated from February-March, 1933, or from mid-summer, 1932. The physical volume of production reached lower levels in 1932 than in 1933; the number of wage-earners employed was as low in 1932 as in early 1933. On the other hand, aggregate wage disbursements and average prices, at wholesale, fell to lower levels in 1933. The domestic statistical evidence is thus conflicting, on the interesting question as to whether the downswing that accompanied the political uncertainties of late 1932 and early 1933 marked a continuation of recession and depression, or a check to recovery that was already under way. (As regards world conditions generally, a recovery seems to have begun in 1932.) For the present purpose, it is desirable to measure changes from the low point of early 1933.

TABLE 1

A RECORD OF THE FORTUNES OF MANUFACTURING INDUSTRIES OF THE UNITED STATES DURING RECOVERY, 1933-1935[1]

BASIC MEASUREMENTS

	February-March 1933	*June-July 1933*	*January-February 1935*
Physical volume of production	100	157	149
Number of wage-earners employed	100	115	133
Total wage disbursements (payrolls)	100	127	172
Average number of working hours per week, per person	100	114	95
Average selling price of products	100	109	124

[1] Descriptions of the series given in this table will be found in the notes at the end of this paper.

Table 1, in relative form. These series are based upon records of production, employment, payrolls, hours and selling prices relating to the operations of the major manufacturing industries of the United States.

The general changes occurring during the periods distinguished in Table 1 are familiar. The first spurt of recovery carried all series upward, the advance of 57 per cent in production being outstanding. The changes of the nineteen months following brought a net reduction in production, further notable advances in prices, payrolls and number employed, and a pronounced decline in average hours worked per week.

But a more detailed comparison of these movements is required to bring out the distinctive features of the period that opened with the spring revival of 1933. In making such comparisons, and in deriving the requisite measurements, we must recognize the limitations of the data. There are some differences in the degrees of coverage of the series listed above. Payroll and employment statistics are drawn from 90 manufacturing industries. Records of average hours worked per week relate to 78 manufacturing industries, and within these industries the coverage is somewhat less than for payrolls and employment. Price and production records relate to still different samples of manufacturing operations at large—broad samples, but not the same, in detail, as those from which the other figures come. Comparison of these records and the derivation of measurements from such comparisons must proceed on the assumption that each of the basic series is representative of manufacturing industries in general. Since this assumption is made, the various derived measurements given below should be looked upon as indexes of general tendencies, not as highly accurate measurements of detailed movements.[2]

In respect of timing, certain other difficulties face us, in making comparisons. The basic production statistics are monthly averages or aggregates, while the records of employment, payrolls and hours for each month are derived from data relating to the week ending at the date nearest the middle of the month. The original price quotations vary in this respect, some being averages of daily figures, some averages of weekly quotations, some quotations as of specific dates.

[2] That these series do reflect the general changes occurring in the operations of manufacturing industries is indicated by a comparison with measurements that are comparable, in detail, in respect of coverage. The following series all relate to the same group of 15 important manufacturing industries: those producing iron and steel, automobiles, cigars and cigarettes, cement, leather, boots and shoes, rubber tires and inner tubes, lumber, woolen and worsted goods, cotton goods, carpets and rugs, and flour, and the meat packing, sugar refining and petroleum refining industries. In 1933 the total 'value added' by these industries constituted 24 per cent of the aggregate 'value added' by all manufacturing industries of the United States. We have in this group, therefore, a substantial representation of all manufacturing industries. Measurements derived from these industries will serve to check the more general measurements given in the text. Since, at the time of writing, the detailed measurements are available only through January, 1935, the comparative measurements given extend only through December, 1934-January, 1935.

The fundamental series, for all manufacturing industries and for these 15 industries, appear below.

	Feb.-March 1933	*June-July 1933*	*Dec. 1934-Jan. 1935*
Physical volume of production			
All manufacturing industries	100	157	137
15 industries	100	171	150
Number of wage-earners employed			
All manufacturing industries	100	115	131
15 industries	100	123	139
Total wage disbursements (payrolls)			
All manufacturing industries	100	127	165
15 industries	100	149	195
Average number of working hours per week, per person			
All manufacturing industries	100	114	94
15 industries	100	122	97
Average selling price of products			
All manufacturing industries	100	109	123
15 industries	100	114	130

In this sample, rather heavily weighted by certain basic industries, we find fluctuations more violent than those occurring in manufacturing industries at large, but of the same general character. What is equally important, the relations among the series, with a single minor exception, are the same. It is these relations with which we are concerned.

The difficulties, in respect of the comparability, in time, of the production records and the other series, are greatest for the automobile industry. The cotton textile industry, during the recovery of 1933-35, was also marked by distinctive changes. We may test

Each set of figures may be taken, however, to be generally representative of conditions prevailing in given months. Greater difficulties are introduced by the fact that the final emergence of finished manufactured products lags behind the expenditure of labor and of money in the preliminary productive processes. This lag is not a serious barrier to accurate comparison of statistics of final production and statistics relating to the earlier processes of production if the flow of materials be reasonably steady. When the process is an extended one, however, and when considerable variations in the rate of flow occur, the accuracy of comparisons of concurrent statistics is lessened. Records of employment and payrolls relating to a period of reduced activity may be set against a flow of finished products resulting from a preceding period of excessive activity. Conversely, technical conditions of production may force the maintenance of a considerable labor force even though the production of finished products has been sharply reduced. The automobile industry, with its periods of preparation for the output of new models, and the steel industry furnish examples of production and labor statistics not always strictly comparable on a current monthly basis. If the lags in a particular industry were constant, account could be taken of them, but in some instances they vary appreciably from time to time.

The seasonal factor also complicates the task of comparison. Some of the basic series compared are subject to seasonal fluctuations, others are not. However, there are real doubts as to whether the customary seasonal movements have prevailed, in all cases, under the abnormal conditions of severe depression. In some instances it is certain that they have not. Moreover, the magnitude of the usual seasonal movements is much smaller than the changes here recorded. For these reasons it has seemed desirable, in the present comparisons, to attempt no correction for assumed seasonal variations. The actual records of manufacturing operations have been utilized.

Various technical difficulties, of the types mentioned, are faced in the comparative study of month-to-month fluctuations. Those general movements that persist over longer periods will not be obscured, however, by the erratic changes arising from varying temporal relations of production, employment and prices. In the comparisons actually made in the following pages the difficulty introduced by erratic month-to-month movements is met, in part, through the comparison of averages for several months, rather than indexes for single months. Even so, not too much weight should be attached to extreme movements for limited periods, in records relating to single industries. When the records for different industries support one another, however, and when movements persist over time, it is justifiable to conclude that we are dealing with significant changes, and not with erratic fluctuations resulting from shifting leads and lags among the series compared.

With these considerations and limitations in mind, we may draw such information as we can from the basic measurements cited in Table 1. The index numbers presented in Table 2, which have been derived from those in Table 1, define important aspects of the changes occurring in this period of revival.

TABLE 2

A RECORD OF THE FORTUNES OF MANUFACTURING INDUSTRIES OF THE UNITED STATES DURING RECOVERY, 1933-1935

DERIVED MEASUREMENTS[1]

	February-March 1933	*June-July 1933*	*January-February 1935*
Gross income	100	171	185
Total employment (man-hours)	100	131	126
Average output per wage-earner	100	137	112
Average output per man-hour	100	120	118
Average earnings per wage-earner	100	110	129
Average hourly wages	100	97	137
Average labor cost per unit of product	100	81	115

[1] Explanations of the methods employed in deriving these index numbers will be found in the notes at the end of this paper.

The five basic series and the seven sets of derived measurements constitute the materials of the following analysis. Using these, we may follow the course of recovery and note certain of the changes occurring in the operating conditions of manufacturing industries, and in the relations of these industries to other elements of the national economy.[2]

[2] In this survey we shall use the measurements given in Tables 1 and 2, which are taken to be representative of the movements occurring in manufacturing industries at large in the United States. Attention has been drawn to the lack of perfect comparability among some of the series employed. However, the general conclusions drawn from these comparisons are supported by evidence relating to the smaller sample of 15 major manufacturing industries, for which comparable measurements were given in footnote 2. Index numbers derived from these measurements appear below, together with similar measurements for all manufacturing industries.

	Feb.-March 1933	*June-July 1933*	*Dec. 1934-Jan. 1935*
Gross income			
All manufacturing industries	100	171	169
15 industries	100	195	195
Total employment (man-hours)			
All manufacturing industries	100	131	123
15 industries	100	150	135
Average output per wage-earner			
All manufacturing industries	100	137	105
15 industries	100	139	108
Average output per man-hour			
All manufacturing industries	100	120	111
15 industries	100	114	111
Average earnings per wage-earner			
All manufacturing industries	100	110	126
15 industries	100	121	140
Average hourly wages			
All manufacturing industries	100	97	134
15 industries	100	99	144
Average labor cost per unit of product			
All manufacturing industries	100	81	120
15 industries	100	87	130

In the pages that follow no detailed reference is made to the index numbers relating to these 15 industries. We have here, however, a set of measurements more carefully controlled, in respect of comparability, than are the more comprehensive series cited in the text. The reader seeking to check the statements in the text, concerning general tendencies in manufacturing industries, should refer to the index numbers in this note and in note 2.

the representative character of the general record by narrowing the sample still further, omitting these two industries. The following measurements relate to 13 manufacturing industries.

	Feb.-March 1933	*June-July 1933*	*Dec. 1934-Jan. 1935*
Physical volume of production	100	164	141
Number of wage-earners employed	100	121	130
Total wage disbursements (payrolls)	100	148	178
Average number of working hours per week, per person	100	124	98
Average selling price of products	100	116	134

Again, in this smaller sample of comparable measurements, we find general agreement with the record of the more comprehensive index numbers. There is not absolute agreement in respect of the magnitude of fluctuation, but the directions of movement and the relations among the various series are similar. The representative character of the more general measurements given in the text is validated by the more closely controlled comparisons based on the smaller samples.

II. CHANGES IN MANUFACTURING PRODUCTION, PRICES, EMPLOYMENT, WAGE DISBURSEMENTS AND COSTS DURING THE RECOVERY OF 1933-1935

In following changes in the operations of manufacturing industries since the early months of 1933 we shall deal with various combinations of the measurements presented in Tables 1 and 2. Each combination will contain a single series of major importance and two component elements of that series. In each case the movements of the three related series should be compared. For convenience of reference, the measurements entering into the various combinations are brought together in Table 3. The subsequent discussion should be followed with reference to the detailed entries in this table.

Manufacturing Gross Income and Component Elements

Changes in the gross income of manufacturing industries may result from changes in the number of units produced, or in the average selling price per unit. The first three sets of measurements in Table 3 define these movements during the recovery of 1933-35.[4] In tracing these movements an effective comparison may be made between the changes occurring in the sharp revival of the first four to five months and the net changes of the succeeding year and one-half. As regards gross income and production, a clear conflict of tendencies is revealed. The net gains of the entire period were substantial (85 per cent in gross income, 49 per cent in number of units produced and 24 per cent in average price per unit). Prices advanced persistently in both periods, but in the field of production the advance was achieved within the first brief phase of recovery. During the later era of code installation and operation under the codes, output declined. Gross income, supported by favorable price movements, showed a net advance of eight per cent.

Of course, many factors operated during both the pre-code and code periods. Anticipation of the codes played a part in the first advance. A natural reaction from the tremendous activity of the first advance, activity leading to production of goods in excess of current needs, is reflected in the later record. We shall have a better basis for judgment concerning the part played by code enforcement in the changes of these periods when we have pressed our inquiry further, for the changes defined by certain of the other series are more closely connected with code provisions. The factors affecting total employment are in this category.

Total Manufacturing Employment and Component Elements

The total volume of employment is properly measured in terms of man-hours. Changes in the number of persons employed and in the average hours of work will affect this total. Items (4), (5) and (6) of Table 3 summarize the record of recovery in these elements. The notable increase of 31 per cent in total employment in the pre-code period resulted from almost equal advances in the number employed and in the average number of hours worked per wage-earner. Between mid-summer, 1933, and early 1935 the total volume of employment dropped 4 per cent. This took the form of a considerable decline in average hours worked, a decline only partially offset by an increase in the number employed. These changes, of course, are the manifestations of definite elements of the recovery program. There was spreading of work under the codes, it is true, but by early 1935 it was a smaller total volume of employment that was

[4] In all threefold comparisons of this sort the figure relating to one series is the product of the corresponding figures for the two other series, in the sense that 1.71=1.57x1.09.

TABLE 3

CHANGES IN MANUFACTURING OPERATIONS, 1933-1935
A COMPARISON OF MOVEMENTS DURING DIFFERENT PHASES OF RECOVERY

	Percentage change from		
	Feb.-March 1933 to June-July 1933	*June-July 1933 to Jan.-Feb. 1935*	*Feb.-March 1933 to Jan.-Feb. 1935*
GROSS INCOME AND ITS ELEMENTS			
1. Gross income	+71	+ 8	+85
2. Production (physical volume)	+57	− 5	+49
3. Selling price of products (average)	+ 9	+14	+24
EMPLOYMENT AND ITS ELEMENTS			
4. Total employment (man-hours)	+31	− 4	+26
5. Wage-earners employed	+15	+16	+33
6. Working hours per person (average weekly)	+14	−17	− 5
PRODUCTION AND ITS ELEMENTS			
2. Production	+57	− 5	+49
5. Wage-earners employed	+15	+16	+33
7. Output per wage-earner (average)	+37	−18	+12
4. Total employment (man-hours)	+31	− 4	+26
8. Output per man-hour (average)	+20	− 1	+18
WAGE DISBURSEMENTS AND ELEMENTS			
9. Wage disbursements	+27	+35	+72
5. Wage-earners employed	+15	+16	+33
10. Earnings per wage-earner (average)	+10	+16	+29
4. Employment (man-hours)	+31	− 4	+26
11. Hourly wages (average)	− 3	+41	+37
2. Production	+57	− 5	+49
12. Labor cost per unit (average)	−19	+42	+15

shared among a body of workers some 16 per cent larger. The period of recovery as a whole shows fairly substantial increases in total employment and in number of persons employed, and a drop of 5 per cent in the average number of hours worked, per person.

Physical Volume of Manufacturing Production and Component Elements

Changes occurring in the volume of manufacturing production may be viewed as the resultants (though not necessarily in a causal sense) of changes in the number employed and in output per worker. Items (2), (5) and (7) of Table 3 relate to these series.

The sharp advance in volume of production during the pre-code period was achieved through an increase in the number of workers and a still more pronounced increase in output per person employed. (This latter gain was partially attributable, of course, to an increase in hours of work.) These were changes of the sort customarily occurring in revival, though of exceptional magnitude.[5] A gain of 57 per cent in volume of output, from the very low level of early 1933, carried with it, almost inevitably, a notable advance in output per person, per machine in use, and per man-hour. (We would mis-read the figures if we should take this gain to be the result of a great technical revolution. No such revolution occurred during this brief period of four or five months. The potential advantages of earlier improvements, technical and otherwise, could be realized when this sharp gain in volume of output occurred.) During the year and one-half that followed this early pre-code spurt the number employed continued to increase. Both output per person and aggregate production declined, however.

Changes in the average length of the working week affect the preceding measurements of output per person. In Table 3 changes in total output are shown, in relation to changes in man-hours and in output per man-hour [items (4) and (8)]. Indexes of output per man-hour are a measure of true productivity, far more accurate, of course, than is a measure of output per person under conditions marked by changing hours of work.

The advance of 20 per cent in output per man-hour in

[5] It is probable that returns from all manufacturing establishments, if they could be secured, would show a somewhat smaller increase in production than that indicated by the present records. The great staples necessarily bulk large in any representative index number of production, and these staples are subject to somewhat more extreme swings than are the more diversified final products of manufacture. But that the gain of this period was one of extraordinary magnitude is not to be doubted.

the first early spurt was in some degree a cause, in greater degree a result, of the notable increase in total output. Increased market demand made possible an increase in productivity, an increase in its turn facilitated by earlier improvements in equipment, in technique and in the quality of labor. Over the 19 months that followed this pronounced gain in productivity, output per man-hour was substantially unchanged. A net decline of one per cent is indicated by the available records. This, of course, is an average figure, behind which there doubtless lie productivity losses in certain industries, gains in others.[6] The figures defining net change, over the entire period of recovery, show a rise of 49 per cent in volume of production, an advance of 18 per cent in output per man-hour.

Total Wage Disbursements of Manufacturing Industries, and Elements of the Total

We turn to a survey of wage disbursements during the recovery, viewing these, first, from the point of view of wage recipients. Changes in the aggregate, and in two elements of the aggregate, during the several phases of recovery are defined by the measurements following items (9), (5) and (10) of Table 3.

Total wage disbursements expanded during both pre-code and code periods, the relative advance in the second period being somewhat greater than the gain in the shorter pre-code period. Increases in the number of wage-earners and in average earnings per wage-earner contributed, during both phases of recovery, to the expansion of the aggregate wage bill.

More light is thrown on the changes in wages and earnings during these periods by a somewhat different division of elements. Total wage disbursements may be considered as the product of the number of hours worked and the average wage per hour. Analysis into these elements, which appear as items (4) and (11) in Table 3, makes it possible to follow changes in wage rates, and to determine the relation of these changes to fluctuations in total wage disbursements.

We find quite diverse changes during the two periods compared. The pre-code advance of 27 per cent in the aggregate earnings of manufacturing labor was accompanied by a sharp rise in total man-hours worked (31 per cent), and by a drop of 3 per cent in the average hourly wage. In the later period, characterized by operation under new wage provisions and by a net decline in volume of production, we find a drop of 4 per cent in total man-hours worked, an advance of 41 per cent in average hourly wages. Here was a new factor at work in a period of revival, with definite wage regulations increasing hourly rates at a much earlier stage than was to be expected from the processes of customary revival. The net effect was to increase total wage disbursements 35 per cent between June-July,1933, and January-February, 1935, in spite of declining employment and declining production. Over the entire period of recovery we have a pronounced advance in total wages paid, a considerable rise in man-hours worked, and a notable increase in hourly rates of pay.

[6] It is convenient to measure industrial productivity on a man-hour basis. This is not to be taken to mean that changes in productivity are due exclusively, or even primarily, to the human factor in production. Mechanical equipment and business organization may be far more important factors in changing productivity than human skill or intensity of application.

It is desirable to trace some of the economic accompaniments of these widely different means of achieving the same result—the result being a given gain in the aggregate wages disbursed to manufacturing labor. Certain of these consequences may be followed by comparing changes in wage disbursements [item (9) of Table 3], with changes in total volume of production [item (2)], and in labor cost per unit of product [item (12)].

The increase of 27 per cent in the total wage bill of manufacturing industries during the period of pre-code expansion may be viewed as the net resultant of a gain of 57 per cent in number of units produced and a decline of 19 per cent in average labor cost per unit. Thus, although the average hourly wage dropped only 3 per cent, and average earnings per wage-earner increased 10 per cent, the labor cost per unit fell 19 per cent. This was the result, of course, of a gain of 20 per cent in output per man-hour. This reduction of an important element of production costs worked definitely toward the correction of the great disparity between the prices of raw materials and of manufactured goods that existed at the low point of the depression.

The advance of 35 per cent in total wage disbursements during the code period resulted from two quite different types of change in the component elements. The number of units produced fell 5 per cent, while average labor costs, per unit of product, rose 42 per cent. Increasing production and falling labor costs accompanied the first rapid gain in the total rewards of manufacturing labor. Decreasing production and sharply rising labor costs accompanied the later advance in aggregate payments to labor.[7] For the

[7] This measurement of advance in labor costs is subject to at least two types of bias. It is probable that the larger establishments, which are represented in the sample from which data on payrolls are secured, conformed more closely, on the whole, to code regulations than did the smaller establishments. This would tend to make the measurement of labor costs somewhat higher than it would be were complete coverage possible. On the other hand, it is known that there is a negative bias in the reported payroll statistics, arising from the use of a constant sample. Such bias would tend to lower the measure of labor costs. It is to be noted that these errors, if present, tend to offset one another.

period of recovery as a whole an increase of 15 per cent in labor costs per unit and an increase of 49 per cent in number of units produced contributed to an advance of 72 per cent in total wages paid.

In interpreting these figures and in comparing the pre-code and code periods we must allow, again, for the influence of factors not connected with code administration. A sharp drop in labor costs per unit of product was to be expected, during the first spurt of revival, as an accompaniment of the pick-up from the very low level of activity prevailing in February, 1933. The situation in mid-summer, 1933, offered no such potentialities of sudden reduction in operating costs, even though all working conditions had remained unchanged. On the other hand, had working conditions remained unchanged, it appears altogether unlikely that the first reduction of 19 per cent in labor costs would have been followed by an advance of 42 per cent.[8]

Summary of the Changes of Recovery in Manufacturing Industries

The period between February-March, 1933, and the beginning of 1935 was marked by a curious combination of movements, in the operations of manufacturing industries. We shall understand these movements better if we place in contrast the series in which reversals of movement occurred, after the pre-code spurt of the early months, and the series in which movement of the same general character persisted, during the entire period. We note the following:

Series increasing during pre-code period, with net decline thereafter:

a. Physical volume of manufacturing production
b. Total employment (man-hours)
c. Average weekly working hours per person
d. Output per wage-earner
e. Output per man-hour. (There was a slight net decline in this index, in the code period, but, substantially, it stood at the same level in early 1935 as in mid-summer, 1933.)

Series declining during pre-code period, with net advance thereafter:

a. Average hourly wages
b. Labor cost per unit of product

(At the time of writing, these individual records are available only through January, 1935.)

INDUSTRY	INDEX NUMBERS FOR DEC. 1934-JAN. 1935 (AVERAGE OF FIGURES FOR FEB.-MAR. 1933=100)		
	TOTAL WAGE DISBURSEMENTS	PHYSICAL VOLUME OF PRODUCTION	LABOR COST PER UNIT OF PRODUCT
All manufacturing industries	165	137	120
Fifteen manufacturing industries	195	150	130
Flour milling	131	98	134
Meat packing	160	127	126
Sugar refining, cane	114	103	111
Carpets and rugs	211	153	138
Cotton goods	189	101	187
Woolen and worsted goods	177	174	102
Lumber (sawmills)	200	128	156
Petroleum, refining	122	114	107
Rubber tires and tubes	225	179	126
Boots and shoes	125	96	130
Leather	160	122	131
Cement	139	113	123
Iron and steel	231	228	101
Automobiles	268	212	126
Cigars and cigarettes	131	123	107

These detailed figures confirm the measurements relating to aggregates. The advance in labor costs during the two years of recovery from 1933 to early 1935 was general, among the individual industries for which we have records.

The figures given above for the automobile industry call for comment. It is characteristic of this industry that pronounced shifts occur in the relations between wage payments and final production, because of seasonal marketings and annual changes in models. To allow for these shifts, we may compare production and wage shifts in the automobile industry by six-month periods.

PERIOD	TOTAL WAGE DISBURSEMENTS (PAYROLLS)	PHYSICAL VOLUME OF PRODUCTION	AVERAGE LABOR COST PER UNIT OF PRODUCT
January-June, 1933	100	100	100
July-December, 1933	129	93	139
January-June, 1934	237	172	138
July-December, 1934	170	108	157

The most unambiguous comparison is probably that between the first six months of 1933 and the first six months of 1934, for seasonal movements are thus avoided. An advance of 72 per cent in production was accompanied by an advance of 38 per cent in labor costs per unit of product, in the automobile industry.

This example illustrates the difficulty of comparing monthly data relating to wage payments and total production. General movements may be followed, but the figures should not be looked upon as completely accurate for any one month.

[8] The apparent advance of 42 per cent in average labor cost per unit of product in American manufacturing industries between June-July, 1933, and January-February, 1935, reflects, in part, the abnormal conditions prevailing in mid-summer, 1933, after the first spurt of revival. This figure is useful for comparative purposes, but is not to be taken as an accurate measure of changing industrial efficiency. More significance attaches to the measure defining the change in average labor cost per unit over the two years from February-March, 1933, to January-February, 1935. This net advance of 15 per cent, over a period which includes the sharp reduction of labor costs that occurred during the first four months, was substantial, representing a notable deviation from the typical movement of recovery.

The importance of this matter warrants the presentation of detailed figures on changes in production, in aggregate wage payments and in estimated labor cost per unit of product for the 15 individual industries for which comparable data are available.

Series increasing in both periods:

a. Gross income of manufacturing industries
b. Average selling price of manufactured products
c. Number of wage-earners employed in manufacturing industries
d. Total wage disbursements by manufacturing industries
e. Average earnings per employed wage-earner

If we look at the first two lists, there is every evidence of a reversal of business tendencies after the general upward movement of early 1933. Not only did physical output show a net decline, but the evidence of internal difficulties in the form of retarded productivity and advancing labor costs adds to the darkness of the picture. And yet, thereafter, prices continued to rise, gross income advanced, wage disbursements continued to increase, earnings per employed worker rose, and the number of workers on payrolls continued to increase. Purchasing power was being disbursed in ever-expanding volume, despite the apparently adverse conditions indicated by the various records of physical production, productivity, and labor costs. Here was a curious set of conflicting movements. But we shall have a better perspective on these shifts when we compare them with changes during the preceding recession, and during earlier periods of business revival.

Recovery Movements in Relation to a Pre-Recession Standard

Any economic recovery is, obviously, closely related to the preceding period of recession. That recession must condition the recovery at many points, and vitally affect its character. The exceptional gravity and extent of the recession in American business between 1929 and early 1933 cannot be ignored in surveying the changes brought by recovery. For this reason, we supplement the survey of changes occurring during the phase of recovery, alone, by a summary account of these changes viewed against a pre-recession base. Measurements are given in Table 4. (Certain of the series given in Table 3 do not appear in Table 4.

TABLE 4

RECESSION AND RECOVERY IN AMERICAN MANUFACTURING INDUSTRIES, 1929-1935

	June-July 1929	*February-March 1933*	*June-July 1933*	*January-February 1935*
	IN CURRENT DOLLARS			
GROSS INCOME AND ITS ELEMENTS				
1. Gross income	100	34	58	62
2. Production (physical volume)	100	49	77	72
3. Selling price of products (average)	100	69	75	86
PRODUCTION AND ITS ELEMENTS				
2. Production	100	49	77	72
5. Wage-earners employed	100	57	65	76
7. Output per wage-earner	100	86	118	95
WAGE DISBURSEMENTS AND ELEMENTS				
9. Wage disbursements	100	35	45	61
5. Wage-earners employed	100	57	65	76
10. Earnings per wage-earner (average)	100	61	69	80
11. Average hourly wage	100	78	76	102
2. Production	100	49	77	72
12. Labor cost per unit of product (average)	100	71	58	85
	IN DOLLARS OF CONSTANT PURCHASING POWER			
GROSS INCOME AND ITS ELEMENTS				
1. Gross income[1]	100	54	82	75
2. Production (physical volume)	100	49	77	72
3. Selling price of products (average)[1]	100	111	106	104
WAGE DISBURSEMENTS AND ELEMENTS				
9a. Wage disbursements[2]	100	49	61	74
5. Wage-earners employed	100	57	65	76
10. Real earnings per wage-earner (average)[2]	100	86	94	97
11. Average hourly wage[2]	100	108	103	124
9b. Wage disbursements[1]	100	56	63	73
2. Production	100	49	77	72
12. Labor cost per unit of product[1]	100	114	82	102

[1] The index number of wholesale prices constructed by the National Bureau of Economic Research was used as a deflator.
[2] The index of the cost of living of industrial workers constructed by the National Industrial Conference Board was used as a deflator.

Where doubts as to the accuracy of the measurements for the longer period were serious, it appeared desirable to restrict statements to general terms, and not to cite specific figures.)

Shifting the standard of reference to a pre-recession base has one immediate effect—that of reducing the apparent magnitude of the shifts of recovery. For the recession carried most economic series to such low levels in the winter of 1932-33 that the succeeding rises, in percentage terms, run into relatively high figures. On a pre-recession base the percentage changes are much less pronounced.

In summary, the situation as of January-February, 1935, with reference to the situation existing in June-July, 1929, was marked by the following features:

The gross income of manufacturing industries had been reduced 38 per cent, in current dollars, 25 per cent, in dollars of constant purchasing power, at wholesale. The physical volume of manufacturing production was 28 per cent below the 1929 standard. Per-unit prices were lower, but the average per-unit purchasing power of manufactured goods in wholesale markets was higher. Relatively to other goods, commodities of this type cost more, per unit, than in 1929.

The actual volume of manufacturing employment, measured in man-hours, had been reduced more than 40 per cent and the working force had been reduced one-fourth.

Industrial productivity, per wage-earner employed, had declined. Productivity per man-hour had risen. The amount of the rise may be estimated at something more than 20 per cent. This gain had been scored during the period of recession and in the first spurt of revival.

The aggregate purchasing power of manufacturing labor was some 26 per cent lower. The purchasing power of the earnings of each employed worker (whose hours of work were reduced about 30 per cent) had been reduced about 3 per cent. The purchasing power of an hour's wage (i.e. the real hourly wage) had increased approximately 24 per cent.

The total wage bill of manufacturing industries, measured in dollars of constant purchasing power, at wholesale, was approximately 27 per cent lower. Average labor cost per unit of goods produced had risen approximately 2 per cent (cost being here measured in terms of the same constant value standard).

It is apparent from these figures that the recovery in American manufacturing industries has fallen far short of restoring the pre-recession level of gross income, of production, of employment, or of aggregate purchasing power of labor. Industrial productivity on a man-hour basis, is higher than before the recession, nominal and real wage rates are higher, and real labor costs are somewhat higher.

But we need other criteria, in appraising the shifting movements of the current recovery. Earlier periods of business expansion furnish a useful standard of reference.

III. ECONOMIC CHANGES IN MANUFACTURING INDUSTRIES DURING FIVE PERIODS OF BUSINESS EXPANSION, APPROXIMATELY EQUAL IN RESPECT OF DEGREE OF RECOVERY

A comparison of manufacturing operations during different periods of business expansion may be expected to disclose some of the distinctive features of the current movement. It is true that there exists no fixed schedule of recovery, to which business movements always conform, but something of the nature of a common pattern is found in the cyclical fluctuations of the economic system. Some of the characteristics of this pattern, and distinctive deviations from it, are revealed by the series of measurements presented in this section.

Various modes of comparison are possible, in any such survey. For the present purpose it seems desirable to trace the movements of important economic series over periods of expansion marked by approximately equal degrees of increase in the physical output of manufacturing industries. This magnitude, as averaged for the months of December, 1934, and January, 1935, was 37 per cent greater than at the low point of February-March, 1933.[9] It is pertinent to inquire how the changes occurring in manufacturing industries during this period, in respect of employment, productivity, labor costs, etc., compared with corresponding changes during earlier periods of equal increase in volume of output.[10] We should note that in concentrating attention upon the operations of manufacturing industries we ignore numerous economic factors—such as monetary and credit conditions, relations among elements of the price structure, saving and investment—which condition the course and character of recovery. Our interest, however,

[9] Advances of approximately equal magnitude could not be secured for the three preceding revivals, if the record were carried through January-February, 1935. Since we are interested in operating changes accompanying similar advances, we restrict the survey of recent changes to the movements up to January, 1935.

[10] If we compare, with respect to changes in aggregate production, periods of business recovery widely separated in time, error may be introduced into our conclusions by the changing character of the elements entering into the aggregate. Different industries, marked by important differences of cyclical behavior, may dominate a national economy at different times. These dominant industries would place their own impress on the aggregate into which they enter. But over a period of fifteen years no great changes occurred in the relative importance of elements entering into aggregate manufacturing production, in the United States. It is true that the incidence of recovery may be different, at different times, but this is a condition affecting all comparisons of this sort, in which aggregates of any kind are used.

TABLE 5

CHANGES IN MANUFACTURING OPERATIONS DURING FIVE PERIODS OF BUSINESS EXPANSION APPROXIMATELY EQUAL IN DEGREE OF RECOVERY

	Percentage change from				
	Dec. 1921-Jan. 1922 to Sept.-Oct. 1922	*June-July 1924 to Feb.-March 1925*	*Nov.-Dec. 1927 to April-May 1929*	*Feb.-March 1933 to May-June 1933*	*Feb.-March 1933 to Dec. 1934-Jan. 1935*
GROSS INCOME AND ITS ELEMENTS					
1. Gross income	+42	+46	+31	+50	+69
2. Production (physical volume)	+33	+36	+31	+43	+37
3. Selling price of products (average)	+ 7	+ 7	0	+ 5	+23
EMPLOYMENT AND ITS ELEMENTS					
4. Total employment (man-hours)	+19	+14	+13	+21	+23
5. Wage-earners employed	+16	+ 7	+ 9	+ 8	+31
6. Working hours per person (average weekly)	+ 3	+ 7	+ 4	+12	− 6
PRODUCTION AND ITS ELEMENTS					
2. Production	+33	+36	+31	+43	+37
5. Wage-earners employed	+16	+ 7	+ 9	+ 8	+31
7. Output per wage-earner (average)	+15	+27	+20	+32	+ 5
4. Total employment (man-hours)	+19	+14	+13	+21	+23
8. Output per man-hour (average)	+12	+19	+16	+18	+11
WAGE DISBURSEMENTS AND ELEMENTS					
9. Wage disbursements	+24	+14	+14	+16	+65
5. Wage-earners employed	+16	+ 7	+ 9	+ 8	+31
10. Earnings per wage-earner (average)	+ 7	+ 7	+ 5	+ 7	+26
4. Employment (man-hours)	+19	+14	+13	+21	+23
11. Hourly wages (average)	+ 4	0	+ 1	− 4	+34
2. Production	+33	+36	+31	+43	+37
12. Labor cost per unit (average)	− 7	−16	−13	−19	+20

is not in the economy at large, nor in the full complex of circumstances that shape a business revival. It is in a particular segment of the total, and in the internal relations among the elements of this segment. These relations will not be unaffected by external developments, but these developments are of secondary importance in the present comparison.

In this comparison, as in the earlier one, no attempt is made to introduce corrections for seasonal movements. Accurate indexes of seasonal variation are not available for all the series. Moreover, it is known that in important industries the customary seasonal pattern has been modified, in recent years. For this reason, and because the cyclical changes here in question are of much greater magnitude than the seasonal changes, it seems advisable to utilize the uncorrected records. Accurate adjustment for seasonal swings would modify the picture in detail, but not in fundamental respects.

We may increase the value of this survey by utilizing two different sets of figures for the most recent recovery. The early spurt of 1933 brought an increase in volume of output well in excess of 37 per cent. The closest possible approach to that figure is provided by the period from February-March, 1933, to May-June, 1933, during which the volume of manufacturing production increased 43 per cent. The changes of this phase may be compared with those of the period February-March, 1933, to December, 1934-January, 1935, as well as with those of the recoveries that began in 1921, in 1924, and in 1927. The period of the first rise, in 1933, is short, and therefore the changes must not be looked upon as resulting from a major technical revolution. They are significant changes, however, as regards the actual operating conditions of industry, and the relation of currently-expended effort to current outlay and current returns.

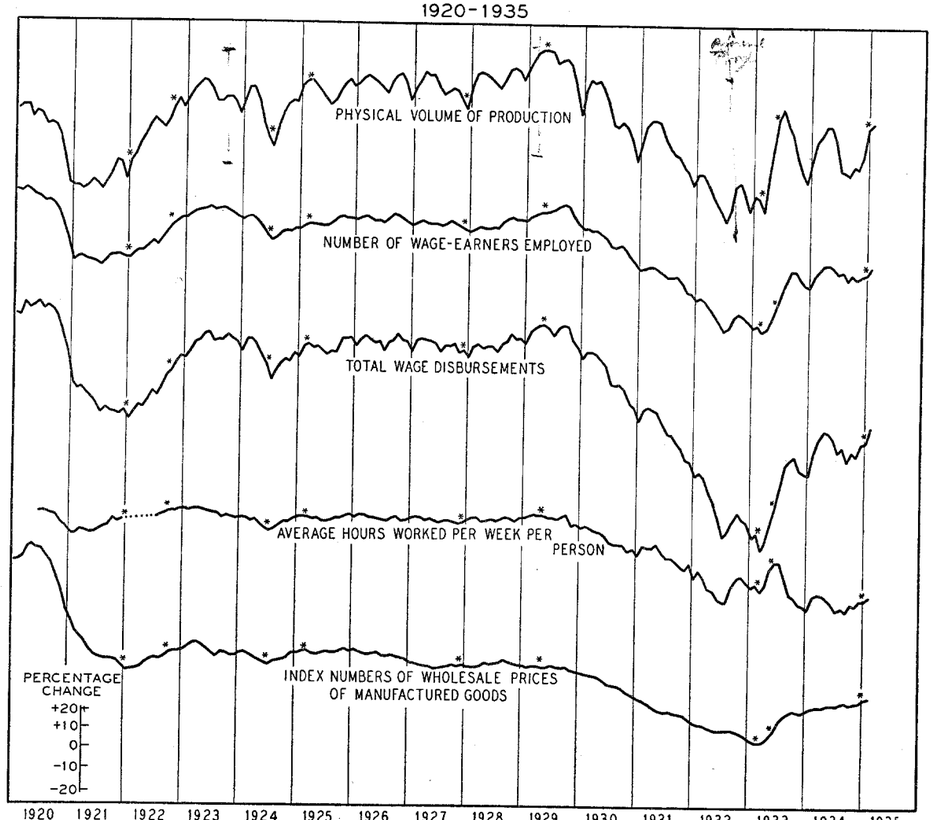
As in the preceding section we shall deal with certain major series and constituent elements of each series. The measurements appear in Table 5. The basic series are presented graphically, and the dates to which the entries in Table 5 relate are indicated in Figure 1, in order that the nature of the measurements to be compared may be clear. Data are picked from their setting, for the purpose of the quantitative comparison, and it is proper that the reader see what this setting is, in each case.

It is obvious, of course, that although the periods of business expansion here compared cover equal degrees of

FIGURE 1

SELECTED SERIES RELATING TO AMERICAN MANUFACTURING INDUSTRIES

1920-1935



*Asterisks mark the terminal dates of the five periods of recovery analyzed in the text.
Plotted on ratio scale. Uncorrected for seasonal fluctuations.

recovery, when physical output of manufactured goods is the yardstick of recovery, they do not cover equal proportionate parts of business cycles. Phases of revival and expansion vary in amplitude and duration, as do business cycles themselves. In studying certain of the technical aspects of business cycles it is desirable to isolate identical cyclical segments. But interest attaches, also, to the comparison of cyclical movements accompanying given degrees of increase in volume of production. This comparison is here made.[21]

Comparison of the items in Table 5, for different periods of recovery, may be readily made in detail by the reader. Certain general conclusions based upon the above evidence, and other data, are given in the final section of this paper. At this point we may be content with a brief summary of the main points revealed by Table 5.

In respect of the attributes defined by the above measurements, the sharp initial recovery of 1933 appears to have conformed to the pattern of earlier revivals, a pattern which is strikingly repeated in the first four of

[21] Reference has already been made to the exceptional severity of the recession of 1929-33, and to the fact that the relative changes of recovery are affected by the severity of the earlier decline. It is to be expected that recoveries, following recessions of varying magnitudes, will differ, in some respects. We do not now know, however, how the pattern of recovery is affected by the preceding recession. The reader will bear in mind the differing magnitudes of the recessions preceding the phases of expansion to which the measurements in Table 5 relate. It will be useful to recall that the volume of manufacturing production declined approximately 27 per cent prior to the 1921 recovery, 26 per cent prior to the 1924 recovery, and 13 per cent prior to the 1927 recovery, as compared with a drop of about 50 per cent from 1929 to 1933. The price drop of 1920-21 exceeded that of 1929-33.

TABLE 6

CHANGES IN MANUFACTURING OPERATIONS DURING FIVE PERIODS OF BUSINESS EXPANSION APPROXIMATELY EQUAL IN DEGREE OF RECOVERY

Measurements Corrected for Changes in the Value of Money

	Percentage change from				
	Dec. 1921-Jan. 1922 to Sept.-Oct. 1922	*June-July 1924 to Feb.-March 1925*	*Nov.-Dec. 1927 to April-May 1929*	*Feb.-March 1933 to May-June 1933*	*Feb.-March 1933 to Dec. 1934-Jan. 1935*
GROSS INCOME AND ITS ELEMENTS					
1. Gross income[1]	+32	+33	+32	+39	+29
2. Production (physical volume)	+33	+36	+31	+43	+37
3. Selling price of product (average)[1]	− 1	− 2	+ 1	− 3	− 6
WAGE DISBURSEMENTS AND ELEMENTS					
9a. Wage disbursements[2]	+27	+12	+18	+15	+46
5. Wage-earners employed	+16	+ 7	+ 9	+ 8	+31
10. Earnings per wage-earner (average)[2]	+ 9	+ 5	+ 8	+ 6	+11
4. Total employment (man-hours)	+19	+14	+13	+21	+23
11. Hourly wages (average)[2]	+ 7	− 2	+ 4	− 5	+19
9b. Wage disbursements[1]	+15	+ 5	+15	+ 7	+26
2. Production	+33	+36	+31	+43	+37
12. Labor cost per unit (average)[1]	−14	−23	−12	−25	− 8

[1] The all commodities index number of wholesale prices constructed by the United States Bureau of Labor Statistics was used as a deflator for the three earlier periods. For the last two periods the index number of wholesale prices compiled by the National Bureau of Economic Research was used.

[2] The index of the cost of living of industrial workers constructed by the National Industrial Conference Board was used throughout as a deflator.

the five periods covered. But the measurements of net change from early 1933 to early 1935 depart appreciably from the customary pattern of recovery, after depression. The notes that follow relate to the net movements of the period from February-March, 1933, to December, 1934-January, 1935.

This period brought a greater increase in gross income than did equal degrees of recovery, in physical terms, in earlier revivals. A much more rapid rise in per-unit selling prices accounted, of course, for the greater increase in gross income.

The number employed increased much more rapidly. Average hours worked per person decreased; earlier recoveries were marked by increases in average hours worked.

Output per worker advanced only slightly. Substantial increases had marked earlier recoveries. The recent increase in volume of production was effected primarily through the employment of more workers.

The net gain in output per man-hour compares favorably with earlier advances. (The gain in the recent period was effected, it has been noted, during the first five months of recovery.)

Total wage disbursements, earnings per wage-earner, and number employed increased much more rapidly than in earlier revivals.

Earnings per hour increased much more rapidly than in earlier periods of revival.

The total wage bill of manufacturing industries and average labor cost per unit of goods produced increased much more rapidly than in earlier revivals.

It is desirable that we supplement these comparative measurements with others in which some account is taken of changes in the standard of value. A rise of 20 per cent in the average selling prices of manufactured goods will have one meaning when the general level of prices remains constant. It will have a quite different meaning when the general price level falls 20 per cent. So, also, a given gain in aggregate payrolls will mean one thing when living costs remain constant, and quite a different thing when living costs are rising rapidly. No single instrument, suitable for correcting all our value series for changes in the value of money, is available. However, by using a general index of wholesale prices in deflating certain series, and an index of living costs for industrial wage-earners for other series, we may approximate the measurements we desire. The results are given in Table 6.

It is apparent, from a comparison of Table 6 with Table 5, that certain of the distinctive features of the recovery of 1933-35 have been due entirely to the more rapid rise of general prices. The apparent advantage of the more recent recovery in respect of per-unit gain in the selling prices of manufactured goods is removed, when account is taken of changing monetary values.[22] So, also, the gain in the gross

[22] The 6 per cent loss in per-unit worth of manufactured goods between February-March, 1933, and December, 1934-January,

income of manufacturing industries, which was higher for the recent period than for any of the earlier periods, when current dollars were the standard of value, becomes the lowest of the figures compared, when correction is made for changing monetary values.

Recent advances in wage disbursements and in the rewards of labor remain substantially above similar gains during earlier periods of recovery, after full account is taken of changing living costs. The total purchasing power of manufacturing labor increased 46 per cent between the low point of early 1933 and the beginning of 1935. The nearest approach to this figure, during periods marked by equal degree of recovery, came in the 1921-22 recovery, when payrolls, corrected for changes in the cost of living, advanced 27 per cent. Comparison of the entries for the last two periods shows that the major part of the recent gain of 46 per cent came after mid-summer, 1933. Reference to the measurements relating to average real hourly wages shows that the active factor in this gain was provided by a sharp increase in real hourly rates of pay (i.e. money rates corrected for living costs). The rise of 19 per cent in these rates, from 1933 to 1935, stands in notable contrast to the narrower movements of earlier revivals.

If we may measure changes in the purchasing power of the manufacturer's dollar with reference to changes in the general level of wholesale prices, and deflate total payrolls accordingly, we have the corrected wage disbursement figures given after item (9b) of Table 6. In dollars of constant purchasing power at wholesale the wage bill of manufacturing industries shows an advance of 26 per cent over the period of recovery in 1933-35. This is distinctly higher than the advances during earlier revivals marked by roughly equal increases in the volume of manufacturing production. The explanation is found in the measurements of changing labor costs, per unit of product. In terms of the same constant dollars, these costs dropped 8 per cent from 1933 to 1935, as compared with drops of from 12 to 25 per cent in earlier recoveries.

Perhaps the most significant comparisons to be made, among the measurements in Tables 5 and 6, are those relating to the changes from February-March, 1933, to May-June, 1933, and from February-March, 1933, to December, 1934-January, 1935. The actual degrees of recovery were nearly the same; the bases from which changes are measured are identical. It is reasonable to assume that the differences between the two sets of measurements are due to new factors introduced into the operations of manufacturing industries after June, 1933. The most important of these new factors were those connected with the industrial codes.

1935, is to be interpreted with reference to the base from which the change is measured. At the low point of early 1933 manufactured goods enjoyed a much greater relative advantage than in any of the three preceding depressions. Reduction of this advantage was the more imperative, therefore, with reference to the conditions of general recovery.

IV. SUMMARY

We may accept the figures presented above as generally representative of the currents of change that have been running in recent months and in earlier periods of business revival, althought we recognize that in detail they would be subject to correction were data relating to all manufacturing industries available. Certain general conclusions are suggested by the findings of fact.

The advance of the pre-code period, from February-March, 1933, to June-July, 1933, definitely followed the pattern of the earlier periods of revival. Primary emphasis was on production as a means of expanding income, profits and the returns of labor. Production advanced more rapidly than selling prices. Production advanced more rapidly than the number of persons employed, and productivity per worker increased. Production advanced more rapidly than number of man-hours worked, and output per man-hour increased. Production advanced more rapidly than wage disbursements, and labor cost per unit of product declined. Expanding production was a major factor in advancing gross income.

With respect to the purchasing power of labor, expanding production played a dominant part. Labor costs per unit of output declined, with rising volume augmenting the total wage bill. Time rates for labor held practically constant, during revival; increasing man-hours of employment operated as the active factor in the expansion of aggregate returns. Total employment (man-hours) rose more rapidly than did the number of persons employed; hours of employment per person increased.

Rapidly increasing production and more slowly rising prices contributed to a sharp advance in gross income. This meant, although present records do not bear on this point, immediate increases in profits, in the aggregate.

These were the conditions accompanying a revival of the traditional type. There is, of course, no reason to accept the pattern of earlier revivals as a criterion to which recovery from the depression of 1931-33 must necessarily conform. This was a graver depression than those we had known before; it differed in character as well as in degree from similar periods of economic stagnation in the past. Moreover, the periods of activity that were launched by these earlier revivals were marked by important economic as well as social defects. There is nothing sacred about the standard defined by these precedents. Yet, in default of other standards, we must get from them such information as we may concerning the operating conditions of this little-understood industrial machine of ours.

The recovery of 1933-35 is differentiated from earlier revivals by the reversal of the traditional pattern of revival that may be dated, it appears, from the general adoption of industrial codes that began in mid-summer, 1933. Of course, it is not fair to conclude that the codes alone accounted for all the reversals we have noted. Many circumstances affected the economic changes of these disturbed months. But it is a just assumption that the new industrial environment created by the codes had an immediate effect upon the internal operating conditions defined by the various ratios presented in earlier sections.

The outstanding feature of the code period lies in the apparent reduction of emphasis on production and industrial productivity as a means of swelling gross income and increasing the aggregate return of labor. Rising prices and somewhat reduced output marked the code period. As regards the productivity of manufacturing industries, the preceding advance (as measured in output per man-hour) appears to have been checked, although no significant decline occurred during the period of operation under the codes. Too much weight should not be placed upon this development, for the factors involved are complex, and the reasons for changes in productivity are seldom clear. The sharp preceding increase in productivity per man-hour (20 per cent in four months) probably represented a full realization of the potential advantages existing at the low point of the depression. A subsequent check does not provide definite evidence of technical or organizational weakness, or of human inefficiency. It is fair to conclude, however, that the new conditions existing after mid-summer, 1933 did not provide a stimulus to enhanced industrial efficiency.

An increase in the aggregate purchasing power of labor was one of the objectives of the recovery program, and such an increase has been very definitely won. Over a period of some 22 months, while the physical volume of manufacturing production was increasing 37 per cent, aggregate wage disbursements by manufacturing industries increased 65 per cent.[13] Equal production increases during the three preceding revivals had brought advances of from 14 to 24 per cent in total wage disbursements. What is here notable is not the degree of increase, however. The fact that wage payments had dropped to excessively low levels in the winter of 1932-33 would lead one to expect a sharper relative advance, with recovery. The distinctive features of the recent rise are found in its relations to other movements of the recovery period. It was an advance accompanied by higher costs, per unit of time and per unit of output, for the services of manufacturing labor, and herein it departed most significantly from the traditional pattern of revival.

Adjustment of these various measurements to take account of changes in the level of prices and in living costs alters the general picture somewhat. The rise in selling prices of manufactured goods in the recent recovery is reduced by such adjustment. The increase in the aggregate purchasing power of manufacturing labor is less pronounced than the increase in wages in terms of current dollars (the actual increase in purchasing power amounted to 46 per cent, however). So, also, the measurement of the changes occurring during the recovery of 1933-35 against a pre-recession standard changes the perspective, and reduces the apparent magnitude of some of the recent changes.

But the characteristic features of the recovery of 1933-35 are clearly discernible, no matter what the standard of reference may be. An apparent check to the advance in industrial productivity, after mid-summer, 1933, a reduction of working hours and an exceptionally heavy use of men to maintain a given volume of physical output, a relatively sharp advance in the aggregate purchasing power of labor and notable advances in labor costs per unit of time and per unit of product are distinctive of the recent recovery.

High labor costs were, of course, a necessary accompaniment of a rapid increase in the time rate of wage payment, unaccompanied by an equal gain in productivity, and of a rise in total wage disbursements far exceeding the increase in physical volume of production. The price of an expansion in purchasing power, so achieved, was the exceptional rise in costs we have noted.

Why did this notable rise in hourly wage rates, in aggregate wage payments, and in labor costs per unit of product not lead to a much sharper rise in the selling prices of manufactured goods than that actually recorded? The prices of manufactured goods rose less rapidly than the general price level during the recovery of 1933-35, a fact apparently inconsistent with the declining productivity and advancing costs we have noted.[14] The answer, I think, is that

[13] These figures relate to changes between February-March, 1933, and December, 1934-January, 1935. The percentages of increase in production and wage disbursements become 49 and 72, repectively, if the records are carried to January-February, 1935. Since the present figures are given for comparison with movements in earlier revivals, the shorter period is covered.

[14] If we take account of the relative movements of the prices of raw and processed goods over the entire period extending from February, 1933, to the end of 1934, definite reductions of the disparities developing during the recession are to be observed (see *Bulletin 53,* National Bureau of Economic Research, December 22, 1934). Yet we mis-read the changes of this period if we fail to note the actual course and timing of these readjustments.

Correction of the disparities existing in February, 1933, called for a rise in raw material prices, relatively to the prices of manufactured goods. Between February-March, 1933, and June-July, 1933, raw materials rose 22.3 per cent in price, manufactured goods 9.0 per cent. This was the pre-code period. During the ten succeeding months from June-July, 1933, to April-May, 1934, the prices of raw materials rose 8.5 per cent, the prices of manufactured goods 10.0 per cent. The earlier ameliorative move-

these advancing costs impeded a downward adjustment of the real prices of manufactured goods, an adjustment imperatively necessary if the foundations of a lasting recovery were to be laid.* During the 43 months of recession from July, 1929, to February, 1933, the prices of raw materials fell 49 per cent; the prices of manufactured goods fell 31 per cent. The gain in the real value, that is in the average per-unit purchasing power, of manufactured goods during this period was 11 per cent. In default of a permanent shift in inter-group relations, correction of this excessive over-valuation of manufactured goods was essential to the restoration of trade in anything approaching normal volume. Some degree of correction was effected, during the period of recovery we have reviewed, but a disparity still existed in the early months of 1935. It was this differential advantage existing at the low point of recession,[15] an advantage that became substantial with an expanding volume of production, that permitted the payment of higher labor costs, and even made it possible for profits to expand, without an exceptional rise in the selling prices of manufactured goods. But the persistence of the margin that permitted higher labor costs to be paid and profits to be reaped, even though volume of output remained low by normal standards, retarded full expansion of sales and of output and the restoration of employment in customary volume. And in so doing it worked to prevent the restoration of a normal volume of wage disbursements.

In following the notable increases in wage disbursements and in labor costs during the recovery of 1933-35 we should not overlook the severity of the preceding declines. If labor costs be measured in the dollars the manufacturer receives for his products (i.e. if labor costs be deflated by an index of the selling prices, at wholesale, of manufactured goods) we find that at the beginning of 1935 these costs stood about where they did in June, 1929. If labor costs in manufacturing industries were high in 1935, then, they were high to the extent that the prices of manufactured goods as a class were high. In respect of the relation of labor cost to the selling prices of manufactured goods, the sharp advance of the period of recovery had done no more than correct for the severe recession that preceded. For labor costs per unit of product had fallen 29 per cent, from June-July, 1929, to February-March, 1933, while the selling prices of manufactured goods had fallen 31 per cent. This means that, with only a minor difference, the aggregate wage bill showed a net decline equal to that occurring in the gross income of manufacturing industries. Wage liquidation paralleled the general drop in gross income, during these four years of recession. In this respect, the recession of 1929-33 stands alone, among recent cyclical declines. For, traditionally, the decline in wage disbursements lags behind the drop in the gross income of manufacturing industries, and labor finds itself, at the bottom of the depression, getting a larger share of the aggregate receipts. This was not true of the 1933 situation.[16]

Of course, the difference between time rates of pay and labor costs per unit of product is to be distinguished, in this analysis. If time rates of pay remain constant, when industrial productivity is increasing, this means that labor as a producer is getting none of the rewards of higher productivity. (As a consumer, of course, manufacturing labor would gain, if the higher productivity were reflected in lower selling prices.) If labor costs per unit of goods produced remain constant, when industrial productivity is increasing, this means that manufacturing labor, as a producer, is getting rewards of higher productivity in the form of higher pay. If the real selling prices of manufactured goods fail to fall, at such a time, it means that the benefits of the increased productivity are not being passed on to consumers generally. (Agents of production other than labor are almost certain, of course, to gain, also.)

If we compare early 1935 with June-July, 1929, we find a notable increase in productivity (probably exceeding 20 per cent per man-hour), practically constant real labor costs per unit of product, substantially higher real rates of pay, per hour of work done, and an actual advance in the real prices at which manufactured goods exchange for other goods. In place of the reduction of real production costs and real selling prices that was to be expected in manufacturing industries, in view of the substantial increase in industrial productivity that had occurred between June, 1929, and February, 1935, those costs and prices had advanced. At a time when the strongest considerations relating to general recovery called for lower selling prices, these prices were maintained at levels above those prevailing for commodities in general.

There is some analogy between the situation prevailing in manufacturing industries from 1933 to 1935 and that which prevailed from 1922 to 1929 (see *Economic Tendencies in the United States,* National Bureau of Economic Research, 1932, Ch. VIII). From 1922 to 1929 profits and overhead charges were maintained at high levels, and the selling prices of manufactured goods failed to decline, to a degree commensurate with the increase in industrial productivity and the fall in labor costs that occurred in that period. This situation tended to reduce marketings and so contributed to the unstable situation existing in 1929. The rise in time rates of pay and in total wage payments in 1933-35, and the failure of overhead and fabricational costs to reflect the great gain in productivity that had occurred since 1929, helped to perpetuate excessively high prices of manufactured goods. (The fabricational costs which thus remained high were not restricted to labor costs. The fact that labor costs did no more than parallel changes in selling prices, when material costs were relatively low indicates that other fabricational charges, such as overhead costs, remained on the same high level as labor costs.) The advance in the prices of these goods, at a time when such goods were already over-valued, retarded a needed expansion in the volume of sales. During the decade of the 'twenties a high manufacturing differential (profits are here included with the differential) was a factor in preventing the *maintenance* of a large volume of production and sales. From 1933 to 1935 a high manufacturing differential was a factor in preventing the *restoration* of a large volume of production and sales.

We are far from knowing all the conditions essential to the steady and efficient operation of a modern industrial economy. But experience during the last ten years seems to justify one general conclusion. The immediate passing on to consumers of a major part of the benefit of increasing industrial productivity, in the form of lower prices, contributes directly to the maintenance of industrial operations on a high level, and to the raising of the standard of living of the people at large. Action designed to procure for special groups the advantages of increasing industrial productivity, or action tending to decrease industrial productivity and advance costs, runs the grave danger of defeating its own purpose, through setting barriers to the maintenance (or the restoration) of the volume of production and employment that is essential to the general welfare.

ments were definitely reversed, during this period of operation under the codes. A new correctional movement took place during the summer of 1934, a movement clearly attributable to the influence of the drought on the prices of farm products. From April-May to August-September, 1934, the prices of raw materials rose 9.6 per cent, the prices of manufactured goods 2.1 per cent. Thereafter, to the end of 1934, there was no net change in the prices of these groups of commodities.

There was, thus, definite improvement in the relative position of raw materials during the period prior to code enforcement, and during the summer drought in 1934. When the movements of these two periods are removed, we find price changes working against the downward readjustment of the real per-unit value of manufactured goods.

*DIRECTOR'S COMMENT:

Other and equally important causes of the failure of these real prices to fall were: the power to sustain prices and restrict output exerted by industry through N.R.A. codes and non-legal monopolistic devices; the relatively large proportion of overhead in manufacturing costs in heavily mechanized industries; the accounting habits which tend to recover all existing overhead even on small volume, thus increasing unit overhead costs; the resistance that large industries are able to offer to capital reorganization or bankruptcy. It cannot be assumed that lower prices would not have been compatible with the existing wage rates if less efficient competitors had been eliminated, if prices had been forced down either by competition or regulation, and larger volume of production had resulted.

—GEORGE SOULE

[15] The potential advantage resulting from price relations was rendered much greater by a considerable increase in output per man-hour during the 43 months of recession.

[16] The comprehensive biennial records available in Census compilations throw light on these changes, during the 1929-33 recession. In 1929 total wage disbursements constituted 16.5 per cent of the gross income of manufacturing industries. By 1931 this percentage had increased to 17.4. This change is in accord with past experience. By 1933, however, the percentage had dropped again to 16.8. Liquidation of wages lagged behind the general process of liquidation during the first two years of recession, but thereafter the reduction of wages was speeded up. By 1933 wage payments constituted only a slightly larger fractional part of the gross income of manufacturing industries than in 1929.

APPENDIX A

NOTE ON SOURCES OF DATA AND CONSTRUCTION OF INDEXES

Production: Index numbers are constructed by the Federal Reserve Board from 55 individual series of data representing the production of about 34 industries and estimated to represent, directly or indirectly, about 80 per cent of the total industrial production of the United States. The figures are reduced to a daily average output and are presented to show the actual production. No correction for seasonal movements has been made in the index numbers here employed. The monthly average for 1923-25 is the base.

Number employed and payrolls: Index numbers are constructed by the United States Bureau of Labor Statistics. The basic data are supplied by representative establishments in 90 important manufacturing industries of the country. For November, 1934, reports were received from over 25,000 establishments employing more than 3,550,000 workers, whose weekly earnings were about 70 million dollars during the pay period ending nearest the 15th of the month. The employment reports received cover more than 50 per cent of the total wage-earners in all manufacturing industries of the country. The three-year average, 1923-25, equals 100.

Average hours worked per week: The index numbers are constructed from data compiled by the United States Bureau of Labor Statistics. The reports come from a smaller number of establishments than are covered in the monthly survey of manufacturing industries. Not all reporting establishments furnish man-hour information. The figures are presented for only those manufacturing industries (78 in number) for which available information covers at least 20 per cent of all the employees in the industry.

Prices: Index numbers are computed by the National Bureau of Economic Research from wholesale prices compiled by the United States Bureau of Labor Statistics. The weighted index for manufactured goods includes 536 price series. The average for the year 1926 is used as base. For the three earlier periods, an average of the index numbers of the wholesale prices of semi-manufac-

tured and finished goods, constructed by the United States Bureau of Labor Statistics, was used. In averaging, these were weighted 1 and 6, respectively.

For the present purpose the base of each of these index numbers has been shifted to February-March, 1933.

The index of changes in gross income is the product of indexes of changes in physical volume of production (number of units produced) and in average selling price per unit. Thus, in deriving the gross income index for June-July, 1933, we have

1.57 (production index) x 1.09 (price index) = 1.71

In the tables these measurements are given in relative, rather than in ratio, form.

The index of total employment (man-hours) is the product of indexes of number of wage-earners employed and of average number of working hours per week, per person.

The index of average output per wage-earner is secured by dividing the index of physical volume of production by the index of number of wage-earners employed.

The index of average output per man-hour is secured by dividing the index of physical volume of production by the index of total employment (man-hours).

The index of average earnings per wage-earner is secured by dividing the index of total wage disbursements by the index of number of wage-earners employed.

The index of average hourly wages is secured by dividing the index of total wage disbursements by the index of total employment (man-hours). We should note that a change in average hourly earnings may result from an actual change in wage rates, or from a shift in the relative proportions of men working at different rates, in the total labor force. An increase in the proportion of men receiving relatively high wages will raise the average, of course, without any modification of wage rates.

The index of average labor cost per unit of product is secured by dividing the index of total wage disbursements by the index of physical volume of production.

APPENDIX B

COMPARISON OF INDEX NUMBERS DERIVED FROM MONTHLY DATA WITH INDEX NUMBERS BASED ON CENSUS RECORDS, MANUFACTURING INDUSTRIES

Supporting evidence that the measurements given in the preceding pages are representative of the general movements occurring in manufacturing industries of the United States is furnished by a comparison, by Census periods, of index numbers derived from the monthly series here utilized with index numbers based directly upon much more comprehensive Census records. For employment and payroll statistics the series compared are not independent, prior to the 1931-33 period, since the monthly records of the Bureau of Labor Statistics have been adjusted to biennial Census records. This process of adjustment, of course, helps to validate the measurements for the earlier periods, which are given in the text.

	1921	*1923*	*1923*	*1925*	*1925*	*1927*	*1927*	*1929*	*1929*	*1931*	*1931*	*1933*
PHYSICAL VOLUME OF PRODUCTION												
Index of National Bureau of Economic Research, based on Census data[1]	100	146	100	102	100	103	100	113	100	75	100	93
Index of Federal Reserve Board[2]	100	151	100	104	100	101	100	112	100	67	100	94
AVERAGE SELLING PRICE OF PRODUCTS												
Index of National Bureau of Economic Research, based on Census data	100	99	100	99	100	94	100	98	100	78	100	85
Index of United States Bureau of Labor Statistics	100	100	100	99	100	94	100	99	100	81[3]	100	93[3]
NUMBER OF WAGE-EARNERS EMPLOYED												
Census	100	126	100	96	100	100	100	106	100	74	100	93
United States Bureau of Labor Statistics	100	126	100	96	100	100	100	106	100	74	100	89
TOTAL WAGE DISBURSEMENTS (PAYROLLS)												
Census	100	134	100	97	100	101	100	107	100	62	100	73
United States Bureau of Labor Statistics	100	136	100	97	100	101	100	107	100	62	100	72

[1] Weighted by value of product.
[2] Weighted by value added.
[3] For the last two periods the index given is that of wholesale prices of manufactured goods, constructed by the National Bureau of Economic Research.

In only four of the comparisons are there notable differences between the measurements drawn from Census records and those derived from monthly observations. Of these, three are of some concern in the present study. The monthly data on employment and payrolls show a somewhat greater change, from 1931 to 1933, than do the Census measurements. Again, the 1931-33 decline in realized prices, as defined by the Census records, appears to have been greater than the decline in the quoted prices compiled by the Bureau of Labor Statistics. In the two former cases greater stability is found in the more broadly-based Census records. (This same condition, it may be noted, is found in the production records over times of rapid change, as from 1929 to 1931.)

It is difficult to gauge the possible effects of these conditions on the measurements relating to the 1933-35 recovery. The greater steadiness of the figures for all manufacturing industries would tend to make total production, total employment and total payrolls rise somewhat less rapidly than do production, employment and payrolls relating to the sample available for monthly study. On the other hand, a tendency to understate the degree of advance in employment and payrolls, during revival, arises from the use of a fixed sample in the Bureau of Labor Statistics compilations. For the results of the operations of new enterprises are necessarily excluded from such compilations. A comparison of Census records with averages of uncorrected monthly figures indicates that the negative bias is probably the more important, for employment and payrolls. This would mean that the advance recorded in the various tables understates the actual advance of these series in 1933-35. Such bias as is present in the monthly production figures probably works toward an overstatement of the actual advance, because of the greater steadiness of the total. As regards prices, however, it is probable that actual realized prices have risen somewhat more rapidly than the quoted prices indicate.

In general, the above comparison of the two sets of basic data confirms the accuracy of the measurements based on monthly records. The fluctuations in the monthly records are probably wider (with the exceptions noted) than those that would be found in more broadly-based index numbers, but the general directions of movement and the relations among the different measurements are definitely similar.

This paper is a by-product of Dr. Mills' study of the price aspects of recession and recovery which the National Bureau hopes to publish within the year. To round out the discussion of price changes, production movements and changes in purchasing power will also be treated in the book.

The report will deal with the fortunes of four major economic groups—producers of primary products, those engaged in manufacturing operations, producers of capital equipment, and consumers—as they were affected by the forces of contraction and by the conflicting currents of the years 1933 to 1935. Primary producers have been in a peculiar position since the World War, and their difficulties were accentuated by the recession of 1929. Manufacturing industries have enjoyed notable gains in productivity and have faced exceptionally difficult problems of readjustment brought about by drastic changes in price levels. The heavy industries, as a special class, are always in a position of strategic importance during depression and recovery. And consumers, at the terminal stage of economic activity, have been greatly affected by the shifting tides of business activity. Alterations in the purchasing power of important consuming groups have played a role of critical importance in the events of the last five years.

The emphasis of the study is definitely upon the price system, as it functioned during a period of severe recession and depression, and as it reacted to the stimulus of changes in monetary and other conditions. In some respects this report will be a continuation of the story told by ECONOMIC TENDENCIES, *which dealt with the modifications occurring in the domestic economy of the United States during periods of expansion prior to and following the World War. The present study is more sharply focussed, however, upon price phenomena. It departs from the pattern of the earlier book also in that it gives some attention to changing world conditions since 1929.*

TRADE BOOK DESIGN, 1934-1935

Mechanization in Industry, by Harry Jerome, published by the National Bureau in 1934, has been included in the American Trade Book Design Exhibition, 1934-1935, as "an intelligently planned and well-executed technical book." The exhibition, which is sponsored by the American Institute of Graphic Arts, opened at the New School for Social Research, 66 West 12th Street, New York, on May 7, and will continue for two weeks. Efforts are being made to have booksellers throughout the country arrange duplicate exhibitions in order to stimulate interest in the problems of bookmaking and design.

Since only twenty-five books were chosen out of over two hundred submitted by publishers the selection of a National Bureau book is recognition of the care with which its books are manufactured. Ernst Reichl, of H. Wolff Book Manufacturing Company, which printed and bound the book, is the designer.

STAFF PLANS

David L. Wickens, who is known for his work on the farm mortgage studies of the Bureau of Agricultural Economics, and who recently supervised the analysis of 350,000 questionnaires concerning urban real estate financing in sixty-five cities obtained by the Real Property Inventory—a Civil Works Administration project sponsored by the Department of Commerce—has joined the National Bureau staff as an Associate. He is in charge of the study of Real Estate Financing and Economic Stability, which the National Bureau has undertaken at the request of the Social Science Research Council, Committee on Credit and Banking of the Division of Industry and Trade, of which Dr. David Friday is Chairman. Dr. Wickens has a staff at work in Washington.

The appointment of Oswald W. Knauth to direct the organization administering relief in New York City makes it necessary to postpone plans for his early return to the National Bureau staff.